

Next Gen EmComm: GECO

This is an unsolicited concept paper created by Greg Lee (HS0ZHM / KI6GIG). It is about emergency communication for people living in remote rural areas. Modern telecommunications are vulnerable in many natural disasters. The rural poor suffer disproportionately more in these catastrophic events. This paper offers a plan to empower the poor. It makes them active emergency communicators. Then they can take an active role in their rescue. They do not have to be helpless victims. This can also increase their resilience to a natural disaster.

Terms:

Next Gen means Next Generation. The children are the future. If trained early, they can prepare basic emergency communications materials and equipment for their community. They can make a positive contribution to their village.

EmComm means Emergency Communications. EmComm is used when normal communications systems fail. There are various kinds of signaling methods. (See GECO below.)

GECO stands for **G**rassroots **E**mergency **C**ommunications **O**perations. [Note: GECO sounds like the name of the gecko lizard. A gecko can cling to walls and ceilings. We want disaster emergency communicators to have similar tenacity.] The most common scene is a lone operator with little or no formal EmComm training. When a disaster strikes, they become an “accidental” EmComm operator. GECO is a bare-bones systematic approach to gathering and sending critical disaster site data to emergency relief authorities.

GECO 1 focuses on non-radio ground-to-air (GTA) communications methods.

These are no tech / low tech (and therefore low cost) methods. They are robust and practical in the austere conditions of a disaster. When dealing with emergencies, it is best to prepare ahead of time. The reality is many are unprepared. GECO 1 works with the materials at hand with an eye to preparation (if feasible). [Note: VU2NXM and HS0ZHM are in the process of compile the GECO 1 guidebook.]

GECO 2 is about the use of CB radios for emergency communications. Wireless communications are best when the normal communications systems are out. CB radio does not require a license. Equipment costs can be less than amateur radio equipment. The range and power are limited. However, networks of CB radios with nearby villages might provide a way to relay messages out to authorities. [Note: This guide is planned for the future.]

GECO 3 uses amateur radios for emergency communications. Many experienced hams may already be GECO 3 capable. A GECO 3 ham must be able to for 48-72 hours on batteries. The assumption is the disaster may totally cut off the station from the outside world. Often, outside help arrives by that time. [Note: HS0ZHM has a rough draft in progress.]

Target Audience:

- **Remote rural villages vulnerable to natural disasters.** They are far from a from emergency relief dispatch centers. Other factors of remoteness are limited transportation access, difficult terrain, or seasonal isolation due to climate. In most cases, helicopters might be the first outside help to arrive.
- **Impoverished peoples** without easy access to emergency relief services. The settlements could be in remote parts of the country or in marginal areas of developed areas with limited access due to social and physical infrastructure barriers.

Assumptions:

- Poverty limits the ability to buy / maintain emergency communications equipment.
- Remoteness makes it hard to get access to equipment and spare parts.
- Poverty and remoteness limit educational opportunities.
- Teachers are reluctant to teach lessons not directly related to required exams. Teaching about emergency communications takes time away from preparing students for the exams.
- Adults in rural impoverished areas are busy working to support their families. They have no time for emergency training. For some, it makes no sense to prepare for something that may not happen.
- Disasters in remote areas cut off people from outside sources of power and supplies. The first outside help to arrive may be a helicopter. Most survivors are not able to communicate with the aircraft.
- Emergency communications is a delicate interplay of self-sufficiency tied to inter-dependence. When disaster strikes rural villages, they depend on help from the government. As Gandhi once said: "Interdependence is and ought to be as much the ideal of man as **self-sufficiency**." Man is a social being." GECO empowers local disaster victims to become pro-active before help arrives. Disaster victims can aid in their own rescue. GECO enables the victims to help the rescuers come to the disaster site.

GECO and Rural Schools:

GECO uses emergency communications to improve education in rural elementary schools. Students can become valuable community members. The lessons are not segmented as in traditional school classrooms. Instead of separate study periods per subject, GECO simultaneously integrates math, science, language, geography, and technology. It covers environmental hazards perception, emergency communications (both radio and non-radio). The paradigm shifts from teaching factual content to teaching the learning process. The knowledge is for use in the real world.

In rural villages, most adults are busy working or caring for the very young or the very elderly. They are trying to survive and provide for their families. They do not have spare time for training.

Most young students are in school. In many rural villages, they might be pulled away to help with farming work. For those who can go to school, the studies are abstract. They have no immediate practical value to family or community life. Education is a “way up and out” from rural poverty. Emergency communications is a theme to make school practical in daily life. Math, science, geography, language, and technology can be taught using activities to prepare for local emergencies and emergency communications. Training young students develops an untapped rural village asset. The students have the time for study. Some students will become interested to learn more about radios. They might want to become hams.

GECO 1: Here is an example of how some non-radio ground-to-air signaling methods fit with existing studies. The lessons are hands-on, interactive class projects. The results become part of a kit for the school or village.

| GTA method | Math | Science | Language | Geography | Technology |
|----------------------------|------|---------|----------|-----------|------------|
| Ground symbols | X | X | X | X | X |
| Ground panels | X | X | X | X | X |
| Body / Hand signals | X | X | X | X | X |
| Smoke | X | X | X | X | X |
| Signal Mirror | X | X | X | X | X |
| Flashlight with Morse code | X | X | X | X | X |

Here is how the academic subjects generally fit with the signaling activities:

- **Math:** Topics cover measurement, proportions, angles, time, duration, and sequence. The various signaling methods use these skills.
- **Science:** Topics include visual contrast, material science, and the science of fire, reflection, and visibility. These are important to signaling. Recognizing the natural hazards of the area, the effects of altitude, season, and time of day form the scientific bases for effect understanding the local conditions before, during, and after a disaster.
- **Language** is used to give and get instructions, to talk in a group and between individuals in the local language. In emergencies, English could be very useful. It is the international language of telecommunications, science, and commerce.
- **Geography:** The local environment provides the basic materials for the various signaling methods. Each has advantages and disadvantages depending on the time of day, season, etc. Local orientations and conditions affect emergency operations logistics. Survivors need to get to “safe” areas accessible to relief teams. Local people may know the area better than relief workers from outside the region. The proper positioning of ground-to-air signals starts with knowing the local scene relative to the direction from which help may be arriving.

- **Technology:** Simply put, technology is about tools and materials. Each signaling method requires different tools and techniques. Subsequent GECO levels use technology that is more sophisticated. It is not so important the level of technology used. It is more important to use the most appropriate method for the existing conditions.

The proper and effective use of GECO also encourages students to gather, analyze, and evaluate the facts. They apply these to make an effective decision. They can make the ground-to-air signaling devices for their school and village. They can teach others in the village what they learned. This is a practical “exam”. It shows their mastery of the subject. No written exam is necessary. Practice can be team competitions. Which team can arrange a ground-to-air panel signal for “need medical care” fastest? Which team can build a signal fire using wet wood?

There are many details associated with each signaling method. This is only a concept paper to start the discussion that can lead to action. Another slogan I created is “Think much, say little, and do more”.

Other Curricular Activities: There are two other curricular activities suitable to rural students. These can supplement GECO.

GROW stands for **G**etting **R**eal **O**n-farm **W**eather. Many farmers are too far from a weather station to get meaningful data. The weather data can help plan rainwater harvesting, soil erosion management, and crop management. Most farmers rely on local weather knowledge and experience. We live in a world of climate change. Past memories can fall short of the new realities. Students can set up a simple weather station at school. They can use it to make and record basic weather observations. These local records can help them better understand climate change for the local area.

MEWS is the **M**obile **E**mergency **W**eather **S**tation. This program adapts basic weather observations to supporting helicopter flight operations. Getting local weather reports from the disaster site can make emergency flights to remote areas safer.

[Note: GROW and MEWS lessons already exist. They are available free of charge for non-commercial and educational use. Please contact rtc2k5@gmail.com for more information.]

I hope we can work together to implement this idea of Next Gen EmComm to make the world a better place for all people.